**Small Business Innovation Research/Small Business Tech Transfer**

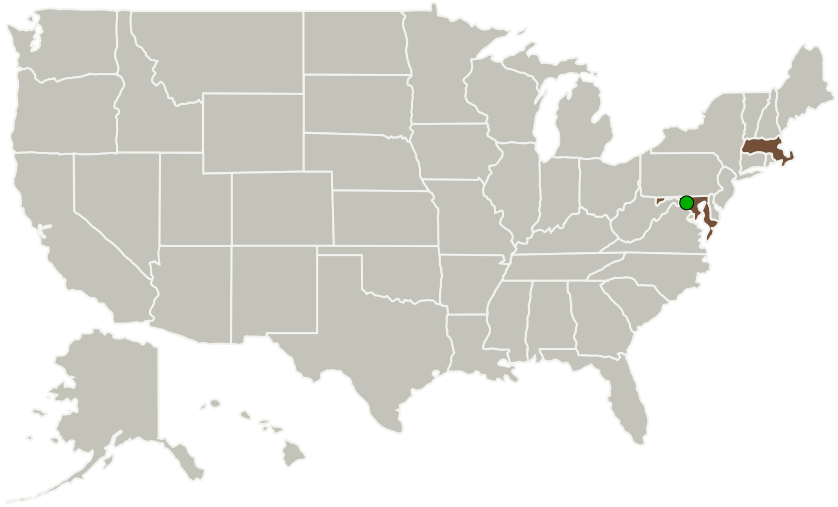
# Low Loss Superconducting Magnets Operating at 15 - 40 K, Phase I

Completed Technology Project (2016 - 2016)

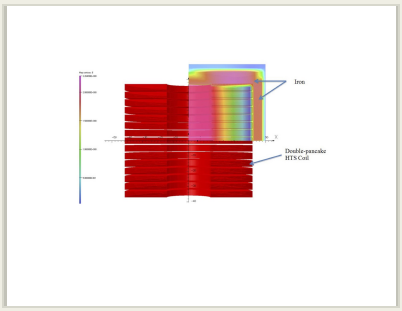
## Project Introduction

This proposal responds to the technological challenge of design and manufacture of shielded superconducting magnets generating 3-4 T at temperatures > 15 K. An efficient ADR or AMRR system is likely to be a multistage stage system having magnets operating at different temperatures. Known superconductors that can operate at > 15 K are: 1) YBCO tapes, 2) Bi2223 wires, 3) Bi2212 wires, 4) MgB2 wires, and 5) Nb3Sn wires. Our Phase I project will have the following technical objectives: a) development and testing of high current density low loss Nb3Sn wires, b) study of AC losses of shielded HTS ADR magnets, and c) development of magnet subcomponents with low eddy current losses. We expect our work on high critical current density low AC loss Nb3Sn wires to come to a successful fruition in the Phase I, and expect our Phase II R&D to be entirely dedicated to development of shielded HTS and MgB2 magnets.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Superconducting Systems, Inc. | Lead Organization | Industry | Billerica, Massachusetts |
| Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |



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# Low Loss Superconducting Magnets Operating at 15 - 40 K, Phase I

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| Primary U.S. Work Locations | |
|---|---|
| Maryland | Massachusetts |

## Project Transitions

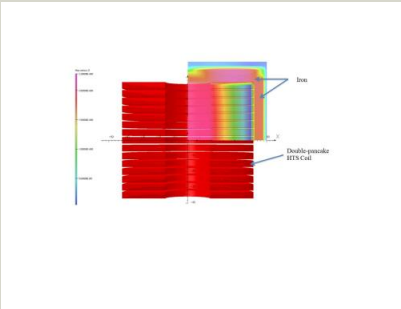
**June 2016:** Project Start

**December 2016:** Closed out

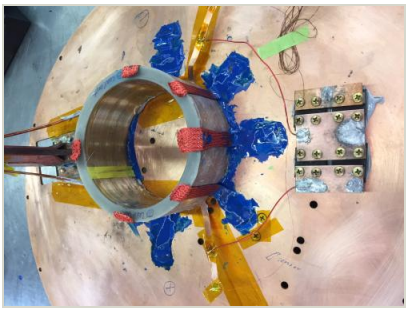
**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/139840)*

## Images



**Briefing Chart Image**
Low Loss Superconducting Magnets Operating at 15 - 40 K, Phase I
*(https://techport.nasa.gov/image/129661)*



**Final Summary Chart Image**
Low Loss Superconducting Magnets Operating at 15 - 40 K, Phase I Project Image
*(https://techport.nasa.gov/image/128691)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Superconducting Systems, Inc.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

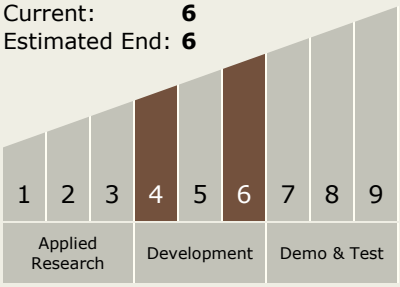
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Shahin Pourrahimi

## Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



# Low Loss Superconducting Magnets Operating at 15 - 40 K, Phase I

Completed Technology Project (2016 - 2016)

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.6 Cryogenic / Thermal

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System